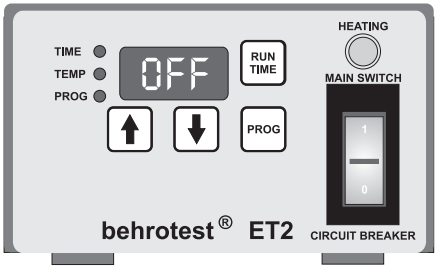
behrotest® ET 2 control unit



Operating instructions

Please read these operating instructions carefully before commissioning your new behrotest® ET 2 control unit.

These instructions will introduce you to the handling of the ET 2 using clear and simple instructions. Additional information, which is useful and important for understanding the functioning of the device is highlighted in the text by means of grey bars.

In the interests of handling the device safely, please take heed of the safety notes marked with a ⚠ in these instructions!

We wish you every success in your work with the

behrotest® ET 2

Safety notes

Ensure that no liquids are able to enter the device! Risk of electric shock!

Before opening the device, the power supply must be disconnected! Risk of electric shock!

Ensure that all connection cables between the control unit and the heater are laid in such a way that they do not touch the heating unit! The cable insulation could become scorched. This would give rise to a risk of short-circuiting or electric shock!

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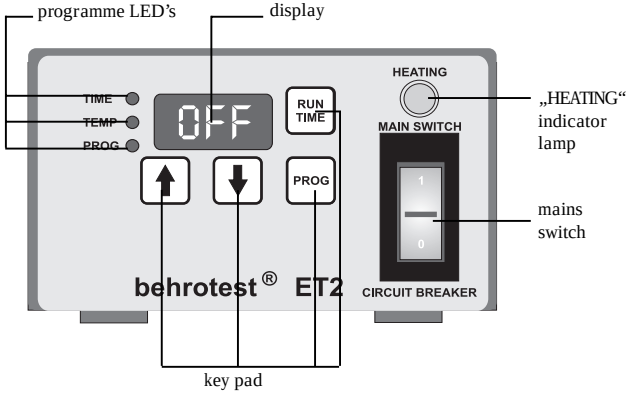
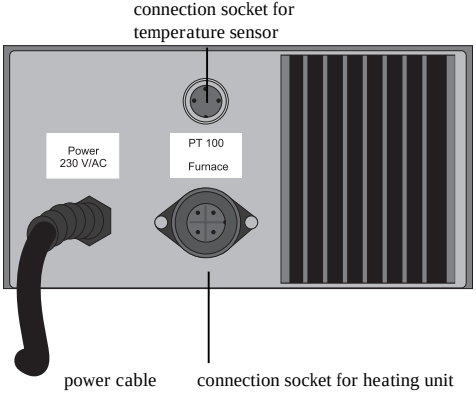
behrotest® ET 2: Overview

Front view



Rear view



Setting up and connecting the device

Setting up the device

Never set the ET 2 control unit up inside an extraction cabinet as aggressive gases can damage the device.

Place the device on a dry and level surface.

Both front feet of the ET 2 can be folded out. This allows the front of the device to be lifted slightly and tilted. This eases operation of the device and the reading of the values shown on the display.

Connecting the device

Connect the ET 2 control unit to the power supply network.

Insert the mains plug for the heater into the four-pole appliance socket („Furnace“) at the rear of the ET 2 and firmly tighten the union nut.

Connect the three-pole diode socket for the sensor in the heater to the socket labelled „PTI00“ on the rear of the control unit. Now also screw this plug tight.

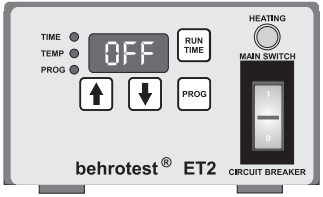
Switching on the device

The behrotest® ET 2 mains switch fulfils two functions. Its first function is to switch the device on and off. Its second function is provided by the fuse integrated into the switch.

This fuse operates similarly to an overload cut-out, which you are familiar with from domestic applications. It interrupts the circuit in the event of a current surge or overload.

Because for this safety function a spring has to be tensioned, the mains switch for the ET 2 requires a greater pressure for switching on than conventional mains switches.

Switch on the control unit at the mains switch. The mains switch is now illuminated, and on the display the message „OFF“ appears.



Operating the device

The behrotest® ET 2 control unit can operate in 2 operating modes:

1. Time-controlled programme
   In the „time-controlled programme“ mode, you select a temperature and then set a time of your choice between 1 and 999 minutes. After this time has expired the ET 2 will automatically switch off.
2. Continuous heating
   In the „continuous heating“ mode, you select a temperature and then start the heating process, which, at the end, is terminated by you operating the mains switch.

Working with the time-controlled programme

Setting the target temperature and the time

Switch on the control unit, if this has not already been done.

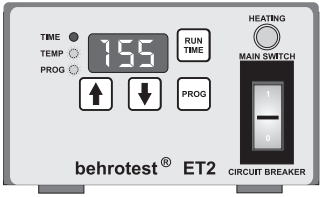
Press the PROG. key. Now the two „TEMP“ and „PROG“ LED's will be illuminated on the ET2 front panel.

On the display, the temperature previously set will be shown. If you are using your control unit for the very first time, the temperature will be shown that had been set in the factory during the functional testing of the unit.

Now select the desired target temperature by means of the ↑ and ↓ keys.

The ET 2 will allow you to select a temperature between 20 °C and 450 °C in 1 °C increments. Continuous pressure on the ↑ and ↓ keys will lead to a continuous change of target temperature with increasing speed.

Example: The set temperature is 155 °C

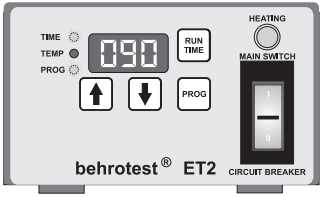


Press the PROG key. Now the two LED's „TIME“ and „PROG“ will be illuminated on the front panel.

Now select the desired target time by means of the ↑ and ↓ keys.

The ET 2 will allow you to select a time between 1 min and 999 min in 1 min. increments. Continuous pressure on the ↑ and ↓ keys will lead to a continuous change of time setting with increasing speed.

Example: The set time is 90 min.



Press the PROG key once again.

On the display you will see „OFF“.

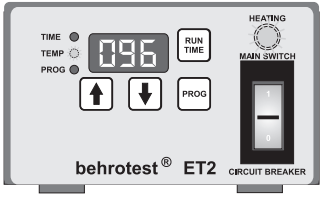
Heating with the time-controlled programme

Heating up the heating unit

Switch on the control unit, if this has not already been done.

First of all, heat the heating unit up to the desired temperature. To do this, press the ↑ key. On the display you will see the current temperature of the heating unit („actual temperature“).

The „HEATING“ lamp provides information about the heating activity.



Inserting the samples

Once the temperature has reached its target value, you can insert the samples.

Heating up the samples

Press the RUN TIME key.

The heating process starts with the target values for temperature and time set by you.

On the display you will see the actual temperature.

The „HEATING“ lamp indicates that heating is in progress.

You can toggle the display from the actual temperature to the remaining time by means of the ↑ key. The „TIME“ and „TEMP“ LED’s will tell you what is currently shown on the display.

After the set time has expired, the control unit will terminate the heating process and a buzzer will be sounded.

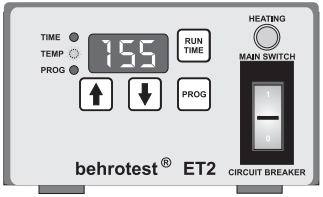
If you wish to terminate the heating process before that, switch off the control unit at the mains switch.

Tip: heating a series of samples

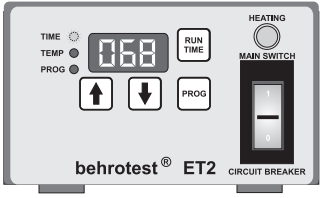
If you wish to heat a large number of samples one after the other, press the ↑ key immediately after the heating process is completed.

In this case, the heating unit will maintain the target temperature and you will avoid the repeated, time-consuming heating up.

After inserting the samples, start the new heating process by pressing the RUN TIME key.



Example: Actual temperature 155 °C



Example: Remaining time 68 min

Operating in the „continuous heating“ mode

Switch on the control unit, if this has not already been done..

Setting the target temperature

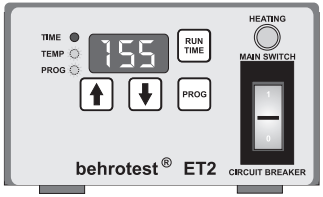
Press the PROG key. Now the two „TEMP“ and „PROG“ LED’s will be illuminated on the ET 2 front panel.

On the display, the temperature previously set will be shown. If you are using your control unit for the very first time, the temperature will be shown that had been set in the factory during the functional testing of the unit.

Now select the desired target temperature by means of the ↑ and ↓ keys.

The ET 2 will allow you to select a temperature between 20 °C and 450 °C in 1 °C increments. Continuous pressure on the ↑ and ↓ keyswill lead to a continuous change of target temperature with increasing speed.

Example: The set temperature is 155 °C



Press the PROG key twice.

On the display you will see „OFF“.

Heating in the „continuous heating“ mode

Switch on the control unit if this has not already been done.

Start the heating process by pressing the ↑ key.

The „HEATING“ lamp provides information about the heating activity.

On the display you will see the current temperature of the heating unit („actual temperature“).

Terminate the heating process by pressing the ↓ key.

What to do if ...

If a fault occurs during operation of the behrotest® ET 2 control unit, a buzzer is sounded and a message on the display will inform you about the nature of the fault.

Fault code	Fault type	Measures for correction of the fault
E03	No signal from Pt100 temperature sensor	Check that the plug for the temperature sensor at the rear of the ET 2 is connected and screwed tight. Switch the control unit off and on again at the mains switch. If the same fault message is then displayed, the temperature sensor in the heating block is probably defective. Please get in touch with our customer service.
E02	Short circuit in the sensor	Please get in touch with our customer service.
E10	Heating is interrupted	Check that the heating block is connected. Check the limit switch in the heating block (see operating instructions for the heating block). Switch the control unit off and on again at the mains switch. If the same fault message is then displayed, the heater in the heating block is defective probably. Please get in touch with our customer service.
E11	General fault	Switch off the control unit without delay and get in touch with our customer service.

The address of our customer service is:

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Spangerstraße 8
D – 40599 Düsseldorf/Germany
Tel.: +49 – 211 – 7 48 47 33
Fax: +49 – 211 – 7 48 47 48
eMail: service@behr-labor.com
Internet: http://www.behr-labor.com

Technical data

External dimensions (w x h x d in mm):	140 x 100 x 270 140 x 135 x 270 with front feet folded out
Weight:	approx. 1.700 g
Material:	powder-coated steel plate
Supply voltage:	230 V/50 Hz
Breaking capacity:	2200 W ohmic load
Connection of the heating devices:	Via integrated four-pole appliance socket. Safety cut-out is integrated into the mains switch
Sensor:	Pt100 three-wire circuit, three-pole diode socket with screw connection for sensor
Control behaviour:	PID with anti-drift control
Temperature control range:	20 ... 450 °C,can be set digitally in 1 °C increments
Control precision:	± 1 K
Time range able to be set	1 ... 999 min, can be set digitally in 1 min increments, or unlimited